



Southern progress in utilizing waste materials: plant producing turpentine, rosin, pine oil, from pine stumps

# INDUSTRIAL DIXIE

**Scientific Research Aids the South . . . Industries Growing . . . South Now Employs 20 Percent of Nation's Factory Workers . . . Promising Future**

By **DANIEL C. ROPER**  
Secretary, Department of Commerce

**C**ERTAIN basic factors—the increasing availability of cheap electric power and the relatively low living costs—place the South in a position especially advantageous for industrial development. These factors, together with its proximity to sources of raw material, particularly cotton, indicate, in the light of its past record, a continuing advance in its industrialization.

Scientific research is doing much to assist in the development of industries in the South. While these trends have not as yet assumed major proportions, they are contributory factors of increasing consequence.

For instance, as a result of scientific research in developing the lumber industry through the South, modern pulp and paper mills have sprung up in many sections during the last ten to fifteen years and are doing well. Research has proved that spruce is not the only wood that can be used for the manufacture of rayon and that other southern wood growths could be satisfactorily used for paper manufacture. As the result of such studies, encouraged by the Forest Products Division of the Department of

Commerce, much progress has been made in wood construction technique.

**A**NOTHER industry that has forged to the front in the South is canning, particularly the canning of citrus fruits and fruit juices. This has come as the result both of scientific research and commercial demand. The first figures in these lines were gathered by the Food-stuffs Division of the Bureau of Foreign and Domestic Commerce, Department of Commerce, in 1920. Since that time the upward curve of southern production of canned grapefruit, and orange and grapefruit juice has been steady. Success with these products prompted further experiments in the canning of peas and tomatoes in the Lower Rio Grande Valley region of Texas and

these are proving to be very successful.

Chemistry has played a very important part in the industrialization of the South. Chemical engineers, utilizing this section's abundant natural resources, have been able to replace much of their loss in naval stores with paper, cellulose, nitrates, bromine, alkali products, wood preservatives, protective coatings, and other chemical manufactures. In 1934 more than 20,000,000 dollars was invested in these last named enterprises in the South.

The recent development of the tung oil industry is another example of the partnership between science, agriculture, and business. Tung oil is extracted from the seed of the tung tree which is native to central and southern China, but which science has successfully

TABLE I—GROWTH IN POPULATION AND INDUSTRY  
The South in comparison with the United States: 1869-1933

POPULATION	1870	1880	1890	1900	1910	1920	1930	1933 <sup>1</sup>
United States.....	38,558,371	50,155,783	62,947,714	75,994,575	91,972,266	105,710,620	122,775,046	125,693,000
The South.....	12,288,020	16,516,568	20,028,059	24,523,527	29,389,330	33,125,803	37,857,633	38,665,000
Percent of U. S.....	31.9	32.9	31.8	32.3	32.0	31.3	30.8	30.8
MANUFACTURES	1869 <sup>2</sup>	1879 <sup>2</sup>	1889 <sup>2</sup>	1899	1909	1919	1929	1933
Number of wage earners: <sup>3</sup>								
United States.....	2,053,996	2,732,595	4,251,535	4,712,763	6,615,046	9,096,372	8,838,743	6,055,736
The South.....	245,725	301,677	550,654	748,940	1,129,307	1,431,682	1,587,260	1,227,475
Percent of U. S.....	12.0	11.0	13.0	15.9	17.1	15.7	18.0	20.3
Wage earners—percent of total population:								
United States.....	5.3	5.4	6.8	6.2	7.2	8.6	7.2	4.8
The South.....	2.0	1.8	2.7	3.1	3.8	4.3	4.2	3.2
Value added by manufacture in thousands of dollars: <sup>4</sup>								
United States.....	1,395,119	1,972,756	4,210,365	4,831,075	8,529,261	25,041,698	31,885,284	14,538,018
The South.....	126,620	172,613	442,728	563,497	1,128,819	3,253,332	4,333,112	2,231,305
Percent of U. S.....	9.1	8.7	10.5	11.7	13.2	13.0	13.6	15.3
ELECTRIC LIGHT AND POWER					1902 <sup>5</sup>	1912	1922	1932
Number of employees: <sup>6</sup>								
United States.....					30,326	79,335	150,762	244,573
The South.....					3,904	10,398	20,932	43,623
Percent of U. S.....					12.9	13.1	13.9	17.8
Thousands of kilowatt-hours:								
United States.....					2,507,051	11,569,110	40,291,536	79,657,467
The South.....					256,896	1,191,509	6,250,661	16,760,955
Percent of U. S.....					10.2	10.3	15.5	21.0

<sup>1</sup>Estimated.  
<sup>2</sup>Figures for 1889 and earlier years include data for "hand and neighborhood industries" (blacksmithing, carpentry, custom tailoring, etc.) and therefore are not strictly comparable with those for 1899 and later years, which do not include such data.  
<sup>3</sup>Not including salaried employees.  
<sup>4</sup>Value of products less cost of materials, containers, fuel, and purchased electric energy. This is a rough measure of the net new value created by the manufacturing processes.  
<sup>5</sup>No data for earlier years.  
<sup>6</sup>Total salaried employees and wage earners.

propagated in the South. This oil, because of its waterproofing qualities, is much used in the manufacture of varnish and in the manufacture of insulating compounds for the electrical industry. It is likewise used as an ingredient of some automobile brake linings. The American tung oil has been found superior to that of China.

Another chemical which formerly had to be imported to this country is bromine, used principally in making dyes and other like commercial products, and high-grade motor fuel. A plant has been established on the coast of North Carolina which is now extracting bromine from sea water. It is reported that 15,000 pounds of this valuable chemical are extracted and marketed daily from 37,000,000 gallons of sea water, or about one pound to every 2500 gallons of water treated. For these factual reasons, the future of southern manufacturing seems propitious in many lines.

The South, with slightly more than 30 percent of the country's population, now employs about 20 percent of the entire country's factory workers. The South, as the term is used in this article, comprises the region lying east of the Mississippi River and south of Mason and Dixon's line (the southern boundary of Pennsylvania) and the Ohio River, together with four states west of the Mississippi, namely, Arkansas, Louisiana, Oklahoma, and Texas—a total of 16 states and the District of Columbia. As compared with the late seventies—say a half a century ago—when the southern states accounted for about 33

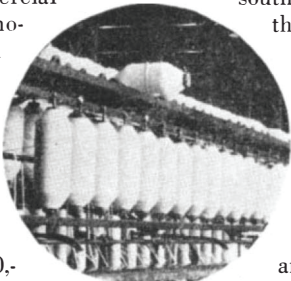
percent of the population and only 11 percent of the wage earners in manufactures, this betokens a noteworthy degree of progress in industrialization, although the South is still predominantly an agricultural region.

In the light of these facts, it is interesting to note that a century and a quarter ago, in 1810, when the first census of manufactures was taken, and when somewhat less than half the population of the country lived in the region south of Mason and Dixon's line, that region contributed approximately one third of the value of commodities manufactured in the United States. Virginia, with a total output somewhat above that of New York, then outranked all other states except Massachusetts and Pennsylvania, and was the leading state in cotton and flax manufactures. (The metal products of Virginia included 1081 swords, valued at 5405 dollars—this being the total production of swords in the entire United States according to the census of 1810.)

Seventy years later, about a decade and a half after the close of the Civil War, when manufacturing was done mainly in factories rather than in homes and in neighborhood shops—as in 1810—the South's share of the nation's industry total had dropped to less than 9 percent, as measured by "value added by manufacture" (see footnote 4, Table 1), and 11 percent as measured by number of workers employed. From that time (1879)

onward the census records show, decade by decade, substantial increases in the amount of manufacturing done in the South, until in 1929 the southern factories employed nearly 1,600,000 workers, with products valued at more than ten billion dollars, and contributed a net of four and one-third billions to the nation's wealth. During the following four years the South shared in the general industrial depression, but it is noteworthy that its percentage of the nation's factory workers increased from 18.0 in 1929 to 20.3 in 1933, and that during the same period its percentage of the total "value added by manufacture" rose from 13.6 to 15.3 percent.

TABLE 1 sets out in condensed form the record of the South's progress in industrialization during the 64-year period beginning with 1869. The most striking increase shown in Table 1 is in the electric light and power industry, where employment rose from 3904 in 1902 to 43,623 in 1932, and production increased from 257,-



Cotton

TABLE II  
This table presents statist

INDUSTRY	NUMBER OF ESTABLISHMENTS <sup>1</sup>		
	1899	1929	1933
All industries in the South.....	36,376	41,296	24,4
LEADING INDUSTRIES			
Cotton goods.....	417	821	7
Lumber and timber products not elsewhere classified.....	14,171	8,701	2,0
Knit goods.....	82	357	3
Railroad repair shops, steam.....	308	449	4
Cigars and cigarettes.....	1,184	188	
Steel-works and rolling-mill products.....	38	48	
Rayon and allied products.....	—	14	

<sup>1</sup>The figures for 1899 cover all establishments reporting products used at \$500 or more, whereas the corresponding minimum limit for 1 and 1933 was \$5,000. This change materially reduced the number of establishments covered by the census, but had only a negligible effect on the figures for wage earners, value added by manufacture, and horsepower.

000,000 to 16,761,000,000 kilowatt-hours. During this 30-year period the South's proportion of the total output of electric energy in the United States more than doubled—increasing from 10.2 percent to 21 percent.

The increase in number of workers employed does not afford a true indication of the actual increase in the amount of manufacturing. The industrial growth of a nation or of a region can be measured adequately only by a production index representing *quantities*. No such index has been prepared for the South or for any other section of the United States, but the results of a careful study of the manufactures-census figures for the United States as a whole indicate that the progress in mechanization of factory equipment during the 30-year period from 1899 to 1929 had brought about an increase of 65 percent in the average output per wage-earner, and that four years later this average was 50 percent above that for 1899. If it be assumed that the output per worker in the South has increased in like proportion, the quantity of manufactured goods made in the South was about three and one-half times as large in 1933 as in 1899. Moreover, it would not seem unreasonable to assume that the percentage of increase in this respect has been somewhat greater in the South than in the United States as a whole, for the reason that in those industries that have spread to the South during recent years mechanization has probably reached a somewhat higher level than elsewhere, since such changes would not necessitate the replacement of obsolescent equipment. The reluctance to abandon old equipment has doubtless retarded mechanization in some of the older industrial centers.

SOME measure of the increase in factory mechanization is afforded by the figures given in the last four columns of Table 2, from which it will be seen that the horsepower rating of the prime movers and electric motors used to drive factory machinery in the South increased from 1,715,000 in 1899 to



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8,067,000 in 1929. This is an increase of approximately 370 percent during a period within which the gain recorded for wage-earner employment amounted to about 110 percent.

Table 2 measures the growth, since the beginning of the present century, of the seven leading industries in the South. These seven industries, each of which employed more than 30,000 factory workers, together accounted for nearly half of the total number of factory wage-earners reported for the South at the 1933 census.

The cotton goods industry, as is well known, is by far the most important in the South. The record of cotton-mill development dates back to 1880, in which year the cotton-producing states operated only a little more than five percent of the spindles in the United States and consumed only about a quarter of a million bales of cotton, or approximately one seventh of the total American consumption. The increase in the number of spindles in the South was gradual until about 1895, but has been more rapid since then, until in 1927 the number of spindles in the cotton-growing states (including California) exceeded the number in the remainder of

the United States. With only one exception—1905—each year from 1880 onward has shown an increase in the number of spindles in the South; and, beginning with 1922, each year has shown a decrease in the number of spindles in the remainder of the country.

Turning to the record of cotton consumption, we find that in 1911 the cotton-growing states consumed slightly more cotton than all other states and that the margin increased until in 1929 they accounted for approximately three fourths and in 1934 practically four fifths of all the cotton consumed in the United States.

The most striking rate of growth recorded for any southern industry, however, appears for knit goods, in which more than nine times as many wage-earners were employed in the South in 1933 as in 1899—67,000 in the later year as against 7000 in the earlier. The rayon industry is another southern industry which has developed rapidly in recent years. This industry (unknown in 1899) employed 24,000 southern factory workers in 1929 and 30,000 in 1933.

AT the beginning of the century, the leading industrial state of the South, as measured by factory employment, was Maryland, followed in order by Georgia and North Carolina. Ten years later North Carolina led all other southern states in factory employment; and in 1919 and subsequent years North Carolina has been well in the lead of all other states in the South, both in employment and in value added by manufacture. In 1929, the peak year, North Carolina employed nearly 210,000 wage-earners, or more than 13 percent of the total for the South, and contributed 693,000,000 dollars, or 16 percent, of the southern total for value added by manufacture. The marked growth in manufacturing activity in this state is due in considerable part to the development of the cotton textile industry, in which nearly 92,000 workers, or about 44 percent of the state's total in all industries, were employed.

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LEADING INDUSTRIES IN THE SOUTH: 1899, 1929, AND 1933															
for those industries, 7 in number, each of which employed more than 30,000 wage-earners in the South in 1933															
WAGE-EARNERS <sup>2</sup> (Average for the year)						VALUE ADDED BY MANUFACTURE <sup>3</sup>						HORSEPOWER <sup>4</sup>			
NUMBER			PERCENT OF U. S. TOTAL <sup>5</sup>			AMOUNT IN THOUSANDS OF DOLLARS			PERCENT OF U. S. TOTAL <sup>5</sup>			AMOUNT		PERCENT OF U. S. TOTAL <sup>5</sup>	
1899	1929	1933	1899	1929	1933	1899	1929	1933	1899	1929	1933	1899	1929	1899	1929
748,940	1,587,260	1,227,475	15.9	18.0	20.3	563,497	4,333,112	2,231,305	11.7	13.6	15.3	1,714,603	8,066,924	15.2	18.8
102,593	275,280	274,372	34.4	64.8	72.3	41,344	372,983	256,078	26.0	59.6	66.6	223,820	1,332,641	27.8	58.7
120,715	226,123	99,531	42.6	54.0	52.6	87,242	371,592	92,124	35.0	43.5	40.6	571,513	850,286	35.4	42.8
7,401	58,906	67,447	8.9	28.3	35.6	2,620	82,267	73,860	5.9	18.6	28.3	4,116	47,388	7.1	26.1
39,990	104,366	62,168	23.0	28.3	28.2	23,219	175,997	77,117	21.4	26.3	27.1	19,952	347,862	20.1	32.3
16,030	40,779	38,079	17.4	38.7	49.4	615,399	649,417	614,637	15.1	69.6	73.0	993	33,492	20.7	67.6
12,573	42,092	35,422	6.9	10.7	12.8	11,675	138,774	61,954	5.7	9.5	13.7	719,215	762,551	11.4	10.1
	24,090	30,094	—	61.6	67.9	—	67,170	81,019	—	57.8	71.8	—	143,111	—	73.1

<sup>2</sup>Not including salaried employees. <sup>3</sup>Value of products less cost of materials, containers, fuel, and purchased electric energy.

<sup>4</sup>Rated horsepower capacity of prime movers plus that of electric motors driven by purchased energy. No data collected for 1933.

<sup>5</sup>The percentages for "All industries in the South" represent the South's share of the United States totals for all industries, and those for the leading industries represent the South's share of the United States totals for the respective industries.

<sup>6</sup>Figures for 1899 and 1929 not comparable with those for 1933.

<sup>7</sup>Includes horsepower for the blast furnace industry.



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## INDUSTRIAL DIXIE

(Continued from page 289)

This brief survey indicates the significant strides made by the South in its industrial progress. In two generations, this great section of the United States has adjusted itself to the exigencies of changing eras. The deep rural plantation culture and agrarian society have faced the necessity of a fundamental shift in emphasis and economic philosophy. Yet we must not forget the splendid record that has been established in retaining those vital social values inherent in the characteristics of southern culture and tradition. Thus does the history of southern adaptation and development offer an example and a challenge to the entire nation in meeting the complex problems of the present recovery period.